CLAIMS:

1. A signal distribution system for distributing wireless communications network signals, the system comprising:

a plurality of rf transmitters for transmitting rf signals to serve communications devices in a plurality of network cells or sectors; and

characterised in that the system further comprises:

a multiplexer, coupled to the rf transmitters, for multiplexing output signals from the transmitters and outputting a multiplexed transmitter signal;

a signal transporter, coupled to the multiplexer, for transporting the multiplexed transmitter signals to each of the network cells or sectors served by the transmitters; and

a multiplexed signal receiver at each served cell or sector, coupled to the signal transporter, for selecting and receiving a transmitter signal from an rf transmitter serving the cell or sector from the multiplexed transmitter signal.

2. A signal distribution system as claimed in claim 1, further comprising a transmit antenna at each served cell or sector, coupled to an output of a respective multiplexed signal receiver, for transmitting a signal from the rf transmitter serving the cell or sector to a communications device within the cell or sector.

3. A signal distribution system as claimed in claim 2, further comprising at least one signal combiner having inputs coupled to at least two of the rf transmitters and an output coupled to the multiplexer, to combine the outputs of the rf transmitters and output a combined signal for multiplexing.

4. A signal distribution system as claimed in claim 3, wherein each transmitter is connected to a common digital interface to a digital data transmission network.

5. A signal distribution system as claimed in claim 1, further comprising:

a plurality of rf receivers, each associated with a said rf transmitter, for receiving rf signals from devices in the plurality of network cells or sectors;

a cell signal transmitter at each cell or sector, coupled to the signal transporter, for receiving a signal from a communications device in the cell or sector and for outputting a cell or sector signal onto the signal transporter to make up at least part of a multiplexed cell or sector signal; and

a demultiplexer, coupled to the signal transporter, for demultiplexing the multiplexed cell or sector signal and for outputting a plurality of demultiplexed cell or sector signals corresponding to the plurality of rf receivers.

6. A signal distribution system as claimed in claim 5, further comprising a receiver antenna at each said cell or sector, coupled to the respective cell or sector signal transmitter of the cell or sector.

7. A signal distribution system as claimed in claim 5 or 6, further comprising at least one signal splitter having an input coupled to the demultiplexer and outputs coupled to at least two of the rf receivers, to provide at least one said demultiplexed cell or sector signal to two or more of the rf receivers.

8. A signal distribution system as claimed in claim 7, comprising a plurality of rf transceivers, each comprising a said rf transmitter and rf receiver, each transceiver forming part of either a Base Transceiver Station (BTS) of a GSM network or a Node B of an IMT-2000 network.

9. A signal distribution system as claimed in claim 5, wherein the signal transporter comprises a fibre optic cable, the multiplexed transmitter signal comprises an optical signal and the multiplexed cell signal comprises an optical signal.

10. A signal distribution system as claimed in claim 9, wherein the fibre optic cable comprises a pair of optical fibres, a first fibre for transporting the multiplexed

transmitter signal and a second fibre for transporting the multiplexed cell or sector signal.

11. A signal distribution system as claimed in claim 9, wherein the fibre optic cable forms part of a cable TV distribution system.

12. A signal reception system for receiving wireless communications network signals, the system comprising:

at least one rf receiver for receiving rf signals from communications devices in a corresponding plurality of network cells or sectors served by the receiver; and

characterised in that the system further comprises:

a signal transporter for transporting signals from each served cell or sector to a demultiplexer;

a cell or sector signal transmitter at each cell or sector, coupled to the signal transporter, for receiving a signal from a communications device in the cell or sector and for transmitting a cell or sector signal onto the signal transporter to make up at least part of a multiplexed cell or sector signal on the signal transporter; and

a demultiplexer, coupled to the signal transporter and to the rf receiver, for demultiplexing the multiplexed cell or sector signal on the signal transporter and for outputting a plurality of demultiplexed cell or sector signals to the receiver.

13. A signal reception system as claimed in claim 12, further comprising a receive antenna at each said cell or sector, coupled to the respective cell or sector signal transmitter of the cell or sector.

14. A signal reception system as claimed in claim 13, comprising a plurality of said rf receivers for receiving signals from the plurality of network cells or sectors, and wherein the demultiplexer outputs the plurality of demultiplexed signals to the plurality of receivers.

15. A signal reception system as claimed in claim 14, further comprising at least one signal splitter having an input coupled to the demultiplexer and outputs coupled to at least two of the rf receivers, to provide at least one said demultiplexed cell or sector signal to two or more of the rf receivers.

16. A signal reception system as claimed in claim 15, wherein each rf receiver is connected to a common digital interface to a digital data transmission network.

17. A signal reception system as claimed in claim 16, wherein the signal transporter comprises a fibre optic cable, and wherein the multiplexed cell or sector signal comprises an optical signal.

18. A signal reception system as claimed in claim 17, wherein the fibre optic cable forms part of a cable TV distribution system.

19. A signal distribution or reception system as claimed in claim 9 or 17, wherein the fibre optic cable includes a cable loop; the system further comprising a monitor to monitor integrity of signal transmission on the cable loop and a switch responsive to the monitor to reverse a direction of signal transmission on the cable loop in response to the monitor signalling that the integrity of signal transmission is or has been adversely affected.

20. A signal distribution system as claimed in claim 19, wherein a said monitor is located at a cell and the switch is located at a point on the cable loop remote from the monitor; the system further comprising a monitoring signal transmitter for transmitting a monitoring signal from the monitor to the switch.

21. A signal distribution system as claimed in claim 1 or 12, wherein the plurality of served network cells or sectors comprises cells or sectors of a single mobile communications network operator.

22. A signal distribution system as claimed in claim 1 or 12, wherein the plurality of served network cells or sectors comprises cells or sectors of a plurality of different mobile communications network operators.

23. A system for distributing signals from an rf transmitter to a plurality of antennas for transmitting to a plurality of coverage regions, the system comprising:

an rf-to-optical converter for converting an rf input signal from the transmitter into an optical output signal;

a fibre optic cable, coupled to the rf-to-optical converter, for transporting the optical signal; and

a plurality of optical-to-rf converters, each coupled to the fibre optic cable, for providing an rf output signal corresponding to the rf signal from the transmitter to the plurality of antennas.

24. A system as claimed in claim 23, wherein the fibre optical cable comprises a loop and wherein the optical-to-rf converters are coupled to the fibre optic cable at points within the loop.

25. A system as claimed in claim 24, for distributing signals of a cellular communications network, wherein the plurality of antennas serve a plurality of cells or sectors of the network and wherein the transmitter provides a common rf transmit signal for all the said cells or sectors.

26. A method of distributing signals for a communications network, the communications network having a plurality of cells or sectors each served by a transmitter, the method comprising:

multiplexing output signals from the transmitters to provide a composite signal comprising transmissions for each of the plurality of cells or sectors;

distributing the composite signal to each of the cells or sectors; and

selecting, at a said cell or sector, the transmission for the cell or sector from the composite signal.

27. A method of distributing signals as claimed in claim 26, further comprising:

monitoring a signal distribution path; and

switching to an alternate signal distribution path when the monitoring indicates failure or partial failure of the signal distribution path.

28. A method as claimed in claim 27, further comprising using a cable TV network to distribute the said composite signal.

29. A method of receiving signals for a communications network, the communications network having a plurality of cells or sectors each served by a receiver, the method comprising:

receiving signals from communications devices in the plurality of cells or sectors;

forming a multiplexed signal comprising the signals received in the cells or sectors;

transmitting the multiplexed signal to a demultiplexer;

demultiplexing the received signals using the demultiplexer; and

providing the or each receiver with a received signal from each said cell or sector.

30. A method of receiving signals as claimed in claim 29, further comprising monitoring a signal transmission path; and

switching to an alternate signal transmission path when the monitoring indicates failure or partial failure of the signal transmission path.

31. A method as claimed in claim 30, further comprising using a cable TV network to transmit the said multiplexed signal.

32. A method of distributing signals as claimed in claim 26 or a method of receiving signals as claimed in claim 29, wherein the distributed and/or received signals comprise signals for two or more communications networks having different operators.

33. A method of communicating signals for a communications network, the communications network having a plurality of cells or sectors each served by a transmitter and receiver, the method comprising:

multiplexing output signals from the transmitters to provide a composite signal comprising transmissions for each of the plurality of cells or sectors;

distributing the composite signal to each of the cells or sectors; and

selecting, at a said cell or sector, the transmission for the cell or sector from the composite signal; and

receiving signals from communications devices in the plurality of cells or sectors;

forming a multiplexed signal comprising the signals received in the cells or sectors;

transmitting the multiplexed signal to a demultiplexer;

demultiplexing the received signals using the demultiplexer; and

providing the or each receiver with a received signal from each said cell or sector; and

wherein said distributing and said transmitting use separate fibres of a single fibre optic cable.

34. A method of distributing an rf transmitter signal to cells or sectors of a wireless communications network, the method comprising:

converting the rf transmitter signal to an optical signal;

distributing the optical signal to the cells or sectors of the network over a fibre optical cable; and

converting the optical signal to an rf signal for transmission at each said cell or sector.

35. A multiplexer for multiplexing rf output signals from a plurality of transmitters onto a multiplexed output signal, each transmitter serving at least one cell or sector in a cellular communication network, the multiplexer comprising:

a plurality of rf-to-optical converters to convert the rf outputs of the plurality of transmitters to a corresponding plurality of optical signals; and

an optical multiplexer to multiplex the plurality of optical signals to provide a multiplexed optical output signal from which a signal for serving a cell or sector is selectable.

36. A multiplexer as claimed in claim 35, further comprising at least one rf signal combiner for combining rf outputs from a plurality of transmitters serving substantially the same geographical cell or sector, or overlapping cells or sectors, and wherein said rf-to-optical converter is coupled to an output of the rf signal combiner, to convert the combined rf outputs to an optical signal for said optical multiplexer, whereby a signal for serving a cell or sector comprising signals from a plurality of transmitters serving the cell or sector is selectable from the multiplexed optical signal.

37. A multiplexer as claimed in claim 36, further comprising a demultiplexer for receiving a multiplexed optical signal and for demultiplexing an optical signal for at least one said cell or sector from the received multiplexed signal.

38. A multiplexer as claimed in claim 37, further comprising an optical-to-rf converter to receive and convert the demultiplexed optical signal to an rf signal; and an

rf splitter coupled to the optical-to-rf converter to provide the rf signal to two or more receivers serving the said cell or sector.

39. A demultiplexer for receiving and demultiplexing a multiplexed optical signal, the multiplexed signal comprising signals received from a plurality of cells or sectors of a cellular communications network, the demultiplexer comprising:

an optical demultiplexer to demultiplex the multiplexed optical signal into a plurality of separate optical signals, each corresponding to a signal received from a said cell or sector; and

a plurality of optical-to-rf converters, each coupled to the optical demultiplexer, for converting the plurality of optical signals to a corresponding plurality of rf signals for output to a plurality of rf receivers serving the said plurality of cells or sectors.

40. A demultiplexer as claimed in claim 39, further comprising at least one signal splitter having an input coupled to an output of a said optical-to-rf converter and a plurality of outputs, to output a corresponding plurality of versions of an rf signal input to the splitter for providing the rf output signal versions to a plurality of receivers serving substantially the same cell or sector or overlapping cells or sectors.

41. A signal receiver for a cell or sector of a cellular communications network, the signal receiver comprising:

an optical input, to receive a multiplexed optical signal;

an optical selector to select a part of the multiplexed optical signal comprising an optical signal carrying information for an rf signal for the cell or sector; and

an optical-to-rf converter, having an input coupled to the optical selector and an output for receiving and converting the selected part of the multiplexed signal into an rf signal, and for outputting the rf signal for transmission by the cell or sector.

42. A signal transmitter for a cell or sector of a cellular communications network, the signal transmitter comprising:

an rf input for inputting an rf signal received from a cell or sector antenna;

an rf-to-optical converter, coupled to the rf input, for converting the rf input signal to an optical signal; and

an optical multiplexer, coupled to the rf-to-optical converter, to multiplex to the optical signal into a multiplexed optical signal comprising optical signals provided from one or more other cells or sectors.

43. A signal receiver or transmitter as claimed in claim 41 or 42, further comprising an optical signal monitor having an optical input for monitoring an optical signal present at the signal receiver or transmitter; and

a signal transmitter, coupled to the optical signal monitor, for transmitting a system management signal to indicate that a level of the monitored optical signal has dropped below a threshold value.

44. A system for coupling cell transceivers of a cellular mobile communications network to respective cell antennas, the system comprising:

a plurality of said cell transceivers and cell antennas;

a transceiver signal combiner/separator coupled to the plurality of transceivers and to a signal bearer to combine transceiver output signals from the transceivers for output onto the signal bearer and to separate combined transceiver input signals received from the bearer for input to the transceivers;

a signal bearer coupled to the combiner/separator to carry the combined transceiver input and output signals between the transceivers and each cell; and

a plurality of cell signal combiner/separators, each coupled to the signal bearer and to a said cell antenna, to combine a signal received at the cell antenna with other

signals on the signal bearer received at other cell antennas to provide said combined transceiver input signals, and to separate a transmit signal for the cell antenna from said combined transceiver output signals.

45. A system as claimed in claim 44, further comprising a digital interface device interfaced with each said cell transceiver to provide a common physical interface to a data network shared by transceivers of different cellular communications networks.

46. A system as claimed in claim 45, wherein the signal bearer is configured to provide redundant signal paths between a transceiver and a said cell.

47. A system as claimed in claim 46, wherein said transceiver signal combiner/splitter comprises an optical multiplexer/demultiplexer.

48. A system as claimed in claim 44, further comprising a signal combiner/splitter having a first interface comprising a plurality of first signal lines and a second interface comprising at least one second signal line, the plurality of first signal lines being coupled to a subset of said transceivers and the second signal line being coupled to said combiner/separator; the combiner/splitter combining output signals from the subset of transceivers on the first signal lines and providing a combined output signal on the second signal line, and receiving an input signal on the second signal line and outputting versions of the received input signal on the first signal lines for reception by the transceivers.

49. A system as claimed in claim 44, wherein said signal bearer additionally carries television signals.

50. A system as claimed in claim 44, for use with a GSM cellular communications network.

51. A system as claimed in claim 44, for use with an IMT-2000 cellular communications network.

52. A cellular communications sub-system comprising a plurality of transceivers each serving a respective cell, each cell having a cell antenna;

characterised in that

the transceivers for a plurality of said cells are substantially co-located, and in that the system further comprises:

transceiver interface means to combine rf interfaces of a plurality of the transceivers into a combined signal interface;

transport means to transport signals between the combined signal interface and two or more of said cells; and

coupling means to selectively couple signals between said transport means and each said cell antenna.

53. A cellular communications sub-system as claimed in claim 52, wherein said transport means comprises optical signal transport means.

54. A cellular communications sub-system as claimed in claim 53, wherein said optical signal transport means is configured for transporting a supplementary high bandwidth data service.

55. A cellular communications sub-system as claimed in claim 52, wherein said transceiver interface means and said coupling means both include a bi-directional interface for, respectively, said transceivers and said transport means.

56. A cellular communications sub-system as claimed in claim 55, wherein said transceiver interface means and said coupling means each comprise a signal combiner and a signal selector.

57. A signal distribution system for distributing signals for a wireless communications network in which a geographical area covered by the network is divided into cells, the system comprising:

a first wireless transmitter to provide a first signal output for serving a first cell;

a second wireless transmitter to provide a second signal output for serving a second cell;

a multiplexer having inputs coupled to the first and second wireless transmitters to receive the first and second signal outputs from the transmitters and having an output, to multiplex the received transmitter outputs onto a multiplexed output signal;

a signal transporter coupled to the multiplexer output to transport the multiplexed signal to first and second cell sites; and

a first signal selector at the first cell, coupled to the signal transporter to select a first signal from the multiplexed signal corresponding to the signal output from the first transmitter, for serving the first cell.

58. A signal distribution system as claimed in claim 57, further comprising a second signal selector at the second cell, coupled to the signal transporter to select a second signal from the multiplexed signal corresponding to the signal output from the second transmitter, for serving the second cell.

59. A signal distribution system as claimed in claim 58, further comprising first and second wireless antennas at the first and second cells; means coupled to the reception antennas and to the signal transporter to multiplex signals received from the first and second reception antennas onto the signal transporter; and a demultiplexer to demultiplex the first and second receiver signals and to provide the demultiplexed signals to third and fourth receivers serving the first and second cells.

60. A signal distribution system as claimed in claim 57, wherein said signal transporter forms part of a signal transport network providing a domestic analogue and/or digital data transport service.

61. A signal transmission system for transmitting signals between a plurality of transmitters and/or receivers and a corresponding plurality of antennas, each antenna serving a separate cell of a cellular communications system, the signal transmission system comprising a fibre optic cable for coupling the transmitters and/or receivers and corresponding antennas, characterised in that:

the fibre optic cable includes a loop; and in that

the system further comprises a monitor to monitor integrity of signal transmission on the cable loop and a switch responsive to the monitor to reverse a direction of signal transmission on the cable loop and/or to select an end of the cable loop for reception of signals from a cell of the communication system in response to the monitor signalling that the integrity of signal transmission is or has been adversely affected.

62. A signal transmission system as claimed in claim 61, comprising a plurality of said transmitters and a corresponding plurality of said receivers and wherein said fibre optic cable comprises a first fibre for transmitting signals for said transmitters, and a second fibre for transmitting signals for said receivers.

63. A signal transmission system as claimed in claim 62, wherein a said monitor is located at a cell and the switch is located remotely from the monitor, the system further comprising means for transmitting a monitoring signal from the monitor to the switch.

64. A signal distribution system for a GSM mobile communications network comprising a digital communications network, at least one Base Station Controller (BSC) and a plurality of Base Transceiver Stations (BTSs), each Base Transceiver Station having a digital interface coupled to the Base Station Controller via the digital communications network,

characterised in that:

the system further comprises a common digital interface device to the digital communications network; and in that

each of the Base Transceiver Stations is coupled to the common interface device to provide a shared digital connection for the Base Transceiver Stations to the Base Station Controller.

65. A signal distribution system as claimed in claim 64, further comprising signal transportation means for transporting signals to and from a said BTS or Node B to a cell site antenna over a cable TV signal distribution network.

66. A signal distribution system for a IMT-2000 mobile communications network comprising a digital communications network, at least one Radio Network Controller (RNC) and a plurality of Node Bs, each Node B having a digital interface coupled to the Radio Network Controller via the digital communications network,

characterised in that:

the system further comprises a common digital interface device to the digital communications network; and in that

each of the Node Bs is coupled to the common interface device to provide a shared digital connection for the Node Bs to the Radio Network Controller.

67. A signal distribution system as claimed in claim 66, further comprising signal transportation means for transporting signals to and from a said BTS or Node B to a cell site antenna over a cable TV signal distribution network.

68. A signal distribution system as claimed in claim 11, 18, 65 or 67 or a method as claimed in claim 28 or 31, wherein cable TV signals are carried in a first fibre optical transmission band and communications network signals are carried in a second fibre optic transmission band, separate from the first band.